

## RECOMMENDATIONS: DIAGNOSING TICK-BORNE DISEASES IN A LABORATORY – MEETING RESEARCH QUALITY STANDARDS AND PROVIDING PATIENT SAFETY

### REKOMENDACJE „DIAGNOSTYKA LABORATORYJNA CHORÓB ODKLESZCZOWYCH” – PRAGNIENIE SPEŁNIENIA JAKOŚCI BADAŃ I BEZPIECZEŃSTWA PACJENTA

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Wkład autorów:  
A. Study design/planning  
zaplanowanie badań  
B. Data collection/entry  
zebranie danych  
C. Data analysis/statistics  
dane – analiza i statystyki  
D. Data interpretation  
interpretacja danych  
E. Preparation of manuscript  
przygotowanie artykułu  
F. Literature analysis/search  
wyszukiwanie i analiza literatury  
G. Funds collection  
zebranie funduszy

A wide range of laboratory tests available in the market these days may actually cause confusion. One of the missions of the National Chamber of Medical Laboratory Specialists is to dispel doctors' doubts concerning proper interpretation of laboratory tests' results as well as selection of appropriate tests. The team is gathered up of experienced clinicians, laboratory scientists, and researchers who make recommendations on laboratory diagnostics. The recommendation making is based on an analysis of the most common errors in the diagnostic process and detecting their causes. The most important goal of the chamber is to determine the usefulness of diagnostic tests and to help to interpret their results. Other important side issues, such as the tests availability, cost, legal aspects and execution time are also taken into account. Legislative requirements on results and medical diagnostic laboratories carrying out markings are one of the priorities of the working groups issuing guidelines. The key issue are the permissions of those who perform the tests. The requirements apply both to medical diagnostic laboratories, individual studios and persons doing markings. The actions taken are intended to standardize the way of proceeding the examination is done, which should translate into the quality and value of the diagnostic result. Unification of the interpretation of obtained result is also a way that facilitates, or rather allows for, a subsequent correction of diagnosis and better treatment.

One of the first recommendations issued by the self-government of laboratory specialists was *Diagnosing tick diseases in a laboratory*. This publication was the result of the work of the established Working Group, which consisted mainly of clinicians and laboratory scientists: professor Stanisława Tylewska-Wierzbanowska; associate professor Elżbieta Gołąb from the National Institute of Public Health – National Institute of Hygiene; Danuta Szelenbaum-Cielecka, PhD; associate professor, DMSc Tomasz Chmielewski and associate professor Włodzimierz Gut from the National Institute of Public Health – National Institute of Hygiene; associate professor Andrzej Horban – the National Consultant on infectious diseases; professor Sławomir Pancewicz; Justyna Dunaj, PhD from the Department of Infectious Diseases and Neuroinfections of the Medical University of Białystok; and Elżbieta Puacz, PhD, representing the National Chamber of Medical Laboratory Specialists and the Polish Society of Virology.

Tick diseases are a serious epidemiological threat due to specificity of the infection route. Ticks are invasive biological vectors therefore common hygienic practices are ineffective. In Poland, of the greatest medical and veterinary importance next to the tick *Ixodes ricinus* are: *Argas reflexus* (the pigeon tick) and *Dermacentor reticulatus* (the meadow tick). These ticks may be carriers of Lyme borreliosis, anaplasmosis, bartonellosis, tick-borne encephalitis, tularemia, Q fever, babesiosis, and, spotted fever group rickettsiosis [1,2].

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Among the many tests used, blood smears have been acknowledged to be the Gold Standard in diagnosing protozoal and babesiosis infections. The authors have also noted the significance of time, correct technique of smearing and experience of a person performing the test in the process of obtaining the reliable result. Molecular screening is recommended in the diagnosis of tick-borne encephalitis with an alternative of blood cultures on the HL-60 cell line. Other diseases are diagnosed with serological methods (different types) and Western Blot [1,3,4,5,6].

In each of these methods, the pre-analytical phase is an important stage, as it may affect the test result. Proper preparation of the patient, sampling and sample marking as well as transportation are key aspects for subsequent diagnostic activities.

As a rule, routine serological screening is more sensitive than specific examination. This in turn facilitates the diagnostic utility. Every doctor can admit that it is better to verify a false-positive result than to overlook a false-negative one. The wide variety of existing immunochemical tests often causes some difficulty in subsequent interpretation of the result. It is because, depending on the test manufacturer, the result may show some divergence. The root cause of this phenomenon is the pathogen that causes the disease itself. In case of Lyme borreliosis, it is referred to as *Borrelia burgdorferi sensu lato*, which is somewhat misleading as the most common causative agents in Europe and Asia are *Borrelia afzelii* and *Borrelia garinii*. In turn, in North America, the dominant pathogens are *Borrelia burgdorferi sensu stricto* and *Borrelia spielmanii*. In 2012, another species causing disease were discovered in the United States. It was named *Borrelia mayonii*; however, until now the frequency of its occurrence in Europe is unknown. The etiological differentiation of the disease in respect to its pathogen is the key factor why Western Blot is needed in diagnostics. These studies are particularly well-founded to confirm the positive results or to understand the questionable ones. Accordingly, communication between the laboratory scientist and the physician is crucial in the interpretation of each result. Further, it is vital to dispel any doubts before deciding on a possible contact with the patient to consult the result [1,2,7,8].

The National Chamber of Laboratory Diagnosticians does not recommend testing ticks removed from the body of the host. In arachnid's body, the antigenic properties of the micro-organisms continue to multiply and change over the course of their developmental stages and generations. Arthropod microbiota is a collection of many microorganisms potentially hazardous to the host. However, its detection in the vector does not necessarily indicate infection in humans [1,8].

The working groups issuing guidelines pay much attention to legislative matters. Legal acts on issuing results, storing medical records and reporting the confirmed results to health inspections that monitor the presence of pathogens in the environment are available both on the websites of the Ministry of Health and the National Chamber of Laboratory Specialists. All legal changes are constantly updated on these pages and relevant letters are sent to medical diagnostic laboratories throughout Poland. In addition to the legislative acts concerning results, formal considerations regarding sensitive data, i.e. personal and medical history, are vital. Also, patient's formal consent to have the sample taken and have necessary markings done is not without significance. Further, the logistic specificity requires the formalization of the way specimens are packaged and transported, as legally, they are potentially dangerous and infectious.

At the current pace of technological development in medicine and diagnostics, one should expect an adequate progress in the evolution of markings. The Polish National Chamber of Laboratory Specialists makes every effort to ensure that doctors and laboratory technicians and scientists are not left without help in assessing the diagnostic value of new tests. We highly recommend visiting the [kidl.org.pl](http://kidl.org.pl) website (bookmark recommendations) to keep updated on the guidelines issued by the Board.

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